## (19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 22 September 2005 (22.09.2005)

**PCT** 

# (10) International Publication Number WO 2005/088138 A1

(51) International Patent Classification<sup>7</sup>: F15B 15/10, F01B 19/00

(21) International Application Number:

PCT/IB2005/000595

(22) International Filing Date: 10 March 2005 (10.03.2005)

(25) Filing Language:

Italian

(26) Publication Language:

English

(30) Priority Data: TO2004A000150 10 Mar

10 March 2004 (10.03.2004) IT

(71) Applicant (for all designated States except US): PO-LITECNICO DI TORINO [IT/IT]; C.so Duce degli Abruzzi, 24, I-10129 Torino (IT).

(72) Inventors; and

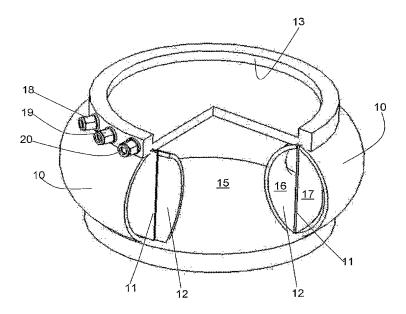
(75) Inventors/Applicants (for US only): FERRARESI, Carlo [IT/IT]; Via Rivalta, 11, I-10045 Piossasco (IT). FRANCO, Walter [IT/IT]; Via Seminario, 2, I-12100

Cueno (IT). **QUAGLIA, Giuseppe** [IT/IT]; Via Dante Boetto, 18, I-10060 Piscina (IT).

- (74) Agent: LOTTI, Giorgio; C.so Vittorio Emanuele II, 61, I-10128 Torino (IT).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: DOUBLE-ACTING DEFORMABLE FLUID ACTUATOR OF THE MUSCLE TYPE WITH THREE CHAMBERS



(57) Abstract: A double-acting deformable fluid actuator with three chambers consists of three axisymmetrical coaxial membranes (10, 11 and 12), constrained by two end pieces (13 and 14) so as to identify three chambers, namely, an inner chamber (15), an intermediate chamber (16), and an outer chamber (17); each chamber is supplied with fluid under pressure through respective connectors (18, 19 and 20) set on one of the end pieces.



## WO 2005/088138 A1



### **Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,

- HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

### **Published:**

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.